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ABSTRACT

Economic long wave research is reviewed and related to major transitions facing higher education. The focus is on economic forecasting as one type of environmental scanning. The Russian economist Kondratieff produced statistical evidence of a long economic wave. The Kondratieff wave appears to be a 45- to 60-year cycle of upswings and downswings in industrialized economies. According to long wave chronology, the late 1980s may represent the final stage of a prosperity plateau before entering about two decades of economic downswing. Attention is directed to the effects of long waves on: college enrollments, revenues and expenditures, educational delivery systems, and governmental involvement. The economic long wave model offers one framework for economic forecasting and for interpreting social, political, and economic developments. It is suggested that a number of undifferentiated, overbuilt, and poorly-managed colleges and universities will be bankrupted by the forces behind a lengthy economic downswing. Many other institutions will survive and succeed during a lengthy economic downturn, due to practices such as innovative and cost-effective educational delivery systems (e.g., tele-learning), and nurturing highly focused constituencies. 9 references. (SW)

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Economic Long Waves and Higher Education

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Abstract

Economic Long Waves and Higher Education

Economists have long examined cyclic patterns of prosperity, recession, depression, and recovery as an analytic tool for interpreting current social, economic, and political events and for developing probabilities of occurrences of future events. This paper reviews economic long wave research and relates it to major transitions facing higher education. Applying the long wave model suggests that industrialized global economies are nearing the end of approximately three decades of relative prosperity. Characteristics of the anticipated steep economic downswing offer strategic opportunities to academic leaders who are aware of the long wave phenomenon and who operate in concert with the wave's cycles.

Economic Long Waves and Higher Education

A fundamental component of strategic planning and analysis as a higher education management tool involves structured environmental monitoring or scanning. Academic leaders who practice strategic planning and analysis also monitor their institutions's social, political, and economic environments. "Strategic planning looks outward and is focused on keeping the institution in step with the changing environment" (Keller, 1983, p. 145).

Numerous techniques have been devised to assess environmental trends and to evaluate threats and opportunities inherent in those trends. For example, futures research has received a considerable amount of attention as a means of monitoring possible societal changes (e.g., Morrison, Renfro, and Boucher, 1983). The purpose of methods such as futures research is to provide higher education administrators with information about potential or even probable futures. Strategies then can be devised for optimally responding to unfolding events.

Although no consensus exists regarding methods for environmental scanning, five areas or categories of forecasting have been suggested (Keller, 1983, p. 158):

1. Technological forecasting;
2. Economic forecasting;
3. Demographic forecasting;
4. Politico-legal forecasting;
5. Sociocultural forecasting.

These areas of environmental scanning obviously are interrelated,

but the focus of the inquiry can be narrowed for purposes of analysis. Technological forecasting, for instance, may ask questions regarding emerging technologies and their impacts upon higher education. Taken separately and collectively, the five areas provide a framework for environmental scanning, and they facilitate constructing alternative futures impacting higher education.

Purpose of the Study

A framework for addressing economic futures as one of the above areas of forecasting is available in the form of economic long wave analysis. The purposes of this paper are (1) to review long wave research, and (2) to suggest implications of this research for interpreting current and anticipated events in higher education. The focus thus is on economic forecasting as one type of environmental scanning. Given the focus on the economic long wave as a model useful in environmental scanning, an examination of shorter waves (e.g., the traditional business cycle) exceeds the scope of this paper.

Economic Long Waves

In the 1920s, a Russian economist, Nikolai Kondratieff, published statistical evidence of a 45- to 60-year long economic wave in the economies of England, France, Germany, and the United States (Kondratieff, 1928). Although not the first to write about long economic waves, Kondratieff is usually credited with drawing much attention to the phenomena, and today the long wave is frequently referred to as the "Kondratieff wave." His primary thesis was that modern capitalist economies' economic development

have occurred "with spurts and fluctuations" (p. 25) rather than in a linear manner. Those economic dynamics included periods of growth and decline, expansion and contraction (Erickson, 1985, p. 145).

At the time of Kondratieff's research, the United States, and to a large extent the world, appeared to have passed through two and one-half complete cycles of growth and decline since the Industrial Revolution. As of the 1980s, three and one-half Kondratieff cycles appear to have been completed. Each of the cycles or waves has been characterized by a period of prosperity, followed by recession, depression, and recovery (van Duijn, 1984, p. 125).

Evidence of Long Waves

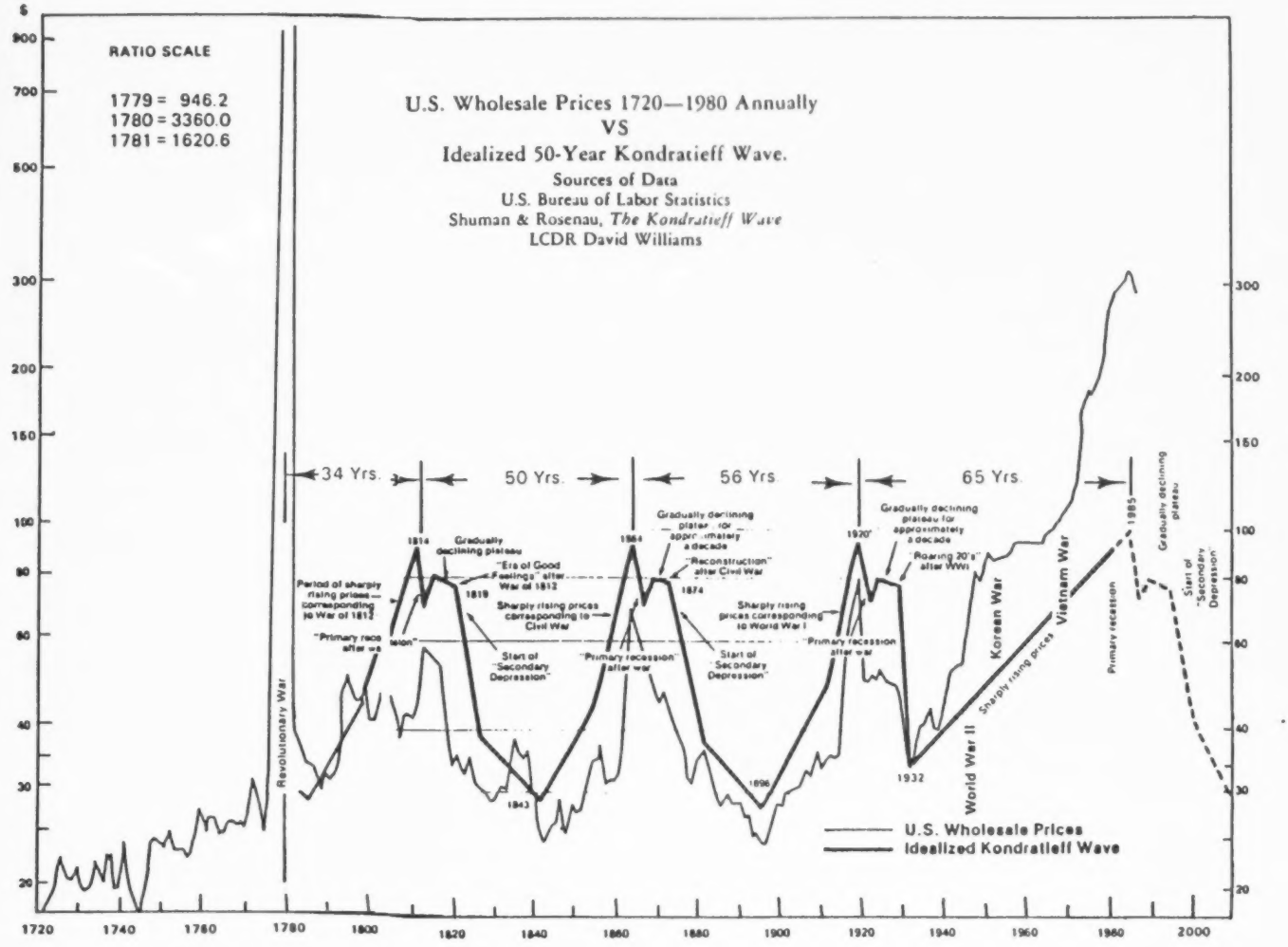
Kondratieff (1928) relied on a variety of international statistical data in his research, such as prices, interest rates, coal and pig iron production, wages, and foreign trade data. Price cycles especially proved useful to his analysis, leading him to conclude that distinct cyclic waves existed, starting from the late eighteenth century. Kondratieff's wave chronology is shown in Table 1. Kondratieff allowed a margin of error for the turning points of the cycles, but the wave-breaks corresponded roughly to the turning points he observed in his data. An example of long waves in price behavior as well as an idealized Kondratieff wave can be seen in Figure 1.

Other researchers since Kondratieff have analyzed other global data and have proposed variations of the long wave chronology. Rostow (1978), for example, suggested shortening the

Table 1
Selected Economic Long Wave Chronologies

	Kondratieff (1925)		Rostow (1978)		van Duijn (1983; 1985)		Stoken (1978)	
	Upswing	Downswing	Upswing	Downswing	Upswing	Downswing	Upswing	Downswing
1st Cycle	1785-95 to 1810-17	1810-17 to 1844-51	1790 to 1815	1815 to 1848	--	--	1785 to 1815	1815 to 1843
2nd Cycle	1844-51 to 1870-75	1870-75 to 1890-96	1848 to 1873	1873 to 1896	1845 to 1872	1872 to 1892	1843 to 1873	1873 to 1897
3rd Cycle	1890-96 to 1914-20	1914-20 to ?	1896 to 1920	1920 to 1933	1892 to 1929	1929 to 1948	1897 to 1929	1929 to 1949
4th Cycle			1933 to 1951	1951 to 1972	1948 to 1973	1973 to ?	1949 to ?	
5th Cycle			1972 to ?					

Figure 1. 1720 - 1986 Annual U.S. wholesale price index and an idealized Krondratieff wave.



Sources: Cycles, 1982, 33(4), p. 126-127; Bureau of Labor Statistics

fourth cycle, thereby allowing for a fifth cycle (Table 1). This hypothesis, however, departs from the more conventional wave chronology proposed by such researchers as van Duijn (1983, 1985) and Stoken (1978) (Table 1).

While economic historians have differed on turning points of long waves, in general they demonstrate their agreement that since the Industrial Revolution, the global economy, along with leading industrial national economies, has experienced at least three and one-half fundamental cycles of development.

Evidence for the existence of long waves has been proposed by Forrester and his colleagues at MIT as a result of their research with the System Dynamics National Model (NM) (Forrester, 1977; 1979; 1985; Sterman, 1985). The NM simulates the physical structure of the economy, flows of information through the system, and behavioral decision rules used by economic actors to manage their affairs. By simulating behavior at the micro level, the NM simulates the macro dynamics driving the historical data used by such researchers as those identified in Table 1. It thus avoids the problem of scarcity of reliable data faced by researchers who rely primarily on historical data.

In simulating the past 200 years, the NM clearly reveals four major economic peaks occurring each 45 to 60 years (Forrester, 1985). "The economic long wave is the phenomenon responsible for the great depressions of the 1830s, the 1890s, and the 1930s and causes such episodes to occur approximately 50 years apart" (p. 16). Forrester and his colleagues conclude that the long wave results primarily from the complex interaction among variables

within the economy and secondarily from forces impinging upon the economy from outside.

Characteristics of Long Waves

An idealized Kondratieff wave consists of four distinct phases: prosperity, recession, depression, and recovery (Shuman and Rosenau, 1972; van Duijn, 1985). The prosperity phase has typically lasted around 25 years and then has been interrupted by a short, possibly steep, recession. This has been followed by a decade or so of relative prosperity (sometimes referred to as the "prosperity plateau") before a sharp downturn into the depression phase. As the period of depression approaches its trough, it gives way to recovery and the beginning of the next long economic cycle.

Kondratieff (1928) and others (e.g., Shuman and Rosenau, 1972; van Duijn, 1983; Stoken, 1980; Forrester, 1985; Erickson, 1985; and Sterman, 1985) have proposed numerous characteristics of the various phases of the waves:

--periods of rising waves are characterized by more years of prosperity and fewer years of recession while periods of downswing display the opposite tendency;

--periods of rising waves include the greatest likelihood of social upheaval, including the most disastrous and expensive wars and social revolutions;

--beginnings of rising waves are accompanied by increases in gold production as well as the appearance of new or developing countries into world markets;

--during downswings in the long waves, agriculture

experiences a severe and prolonged depression;

--during periods of falling waves an especially large number of discoveries and inventions are made which are applied to the production process during the next long upswing;

--prosperity plateaus tend to be bounded on one side by short, postwar recessions and on the other side by severe depressions;

--periods of upswings are accompanied by optimism, risk taking, and liberalism while periods of downswings are accompanied by pessimism, risk aversion, and conservatism;

--peak periods of long waves tend to be characterized by over-expansion and excess production capacity, as well as high real prices and interest rates;

--during the final years of downswings, generalized gloomy moods prevail in society;

--periods of downswing are accompanied by higher rates of unemployment, falling wages, and general underutilization of productive resources;

--peak periods and prosperity plateaus tend to include heightened attention to foreign policy concerns.

The increase in technological innovation first observed by Kondratieff has spawned a considerable amount of interest. Erickson (1985, p. 147), for example, summarized the dominant technological forces leading each long wave cycle as follows:

	Industry	Material	Energy	Communications
1st Cycle	Textile	Cotton	Water	Overland
2nd Cycle	Railroad	Iron	Wood	Telegraph

3rd Cycle	Automobile	Steel	Coal	Telephone
4th Cycle	Electrification	Plastics	Oil	Electronic

Erickson hypothesized that during the 5th wave, likely candidates for leading technological forces include Information, Silicon, Solar, and Space. Van Duijn (1983) concluded from his research that product innovation appeared to be highest during recovery while process innovation within existing industries tended to be higher during the depression phases. As a result of economic simulations with the NM, Sterman (1985) proposed that while innovation is not necessary to explain long waves, each long wave appears to have been built around a grouping of particular synergistic technologies.

A primary conclusion of long wave researchers thus has been that the various phases of the waves have been accompanied by characteristic social, economic, technological, and political occurrences. The transition between each phase has represented a major, complex force dominating the world economy as well as national economies. The tendencies observed within each phase are probably both causes and effects of long wave phases and dynamics.

Causes of Long Waves

The most complete "explanation" for the long wave has been that by Forrester and his colleagues at MIT using the NM (e.g., Forrester, 1985; Sterman, 1985). They have proposed that the long wave is the result of deep-seated economic, psychological, and managerial forces that lead to overexpansion and collapse of the economy. This occurs particularly with capital-producing sectors of the economy. Overexpansion results when the capacity to

produce capital goods exceeds the amount needed to sustain the production process and to maintain growth over time. Eventually production and employment must be reduced to address the accumulated surplus.

A fundamental cause for the overexpansion by the productive sectors of the economy includes the internal structure and policies of firms. Productive systems tend to over-react to changes in demand, thereby amplifying the oscillation in the adjustment of productive capacity to that demand. Examples of this tendency include the common practices of capital-producing firms to over-order inventory and productive materials in response to increases in demand for the finished products. Swollen inventories, employment and wage growth, multiple supply lines, higher prices, and increased expectations of higher profits ripple through each stage of the production and distribution process, amplifying the effect of changes in demand. Internal management practices of firms coupled with unavoidable lags in increasing productive capacities thus contribute to inevitable cycles of overexpansion and collapse. Simulations of such economic dynamics in the NM have yielded cycles of approximately 50 years, roughly coinciding with Kondratieff periodicities.

The Long Wave in Summary

The existence of a long economic wave has been proposed by various economic historians, with the Russian economist, Kondratieff, most often identified as the first to produce statistical evidence of the phenomenon. The Kondratieff wave, as it has become known, appears to be a 45- to 60-year cycle of

upswings and downswings in industrialized economies. Historical data suggest that approximately four long wave cycle peaks have occurred since the Industrial Revolution, with the fourth possibly during the 1970s.

According to long wave chronology, the late 1980s may represent the final stage of a prosperity plateau before entering approximately two decades of economic downswing. Such an extended period of economic decline can be expected to consist of several shorter, relatively severe periods of depression. Characteristics of earlier downswings in the long wave have included higher rates of unemployment, falling prices and interest rates, excess productive capacity, underutilization of productive resources, risk aversion, conservatism, and at its worst, bankruptcy, panic, pessimism, and disillusionment.

Just as the complex of mass economic behavior precipitated the downswing in the wave, those same complex interactive behaviors can be expected to initiate a period of recovery and prosperity. Thus the cycles continue.

Implications for Higher Education

As fundamental social institutions, colleges and universities both impact and are impacted by prevailing economic, social, and political forces. Success, even survival, of institutions may depend upon how effectively academic leaders anticipate and respond to major social transitions. The conceptual framework presented above--that of the economic long wave--offers a mechanism for anticipating possible futures and for preparing for their likelihood. Various events within higher education may be

considered with respect to long wave periodicities.

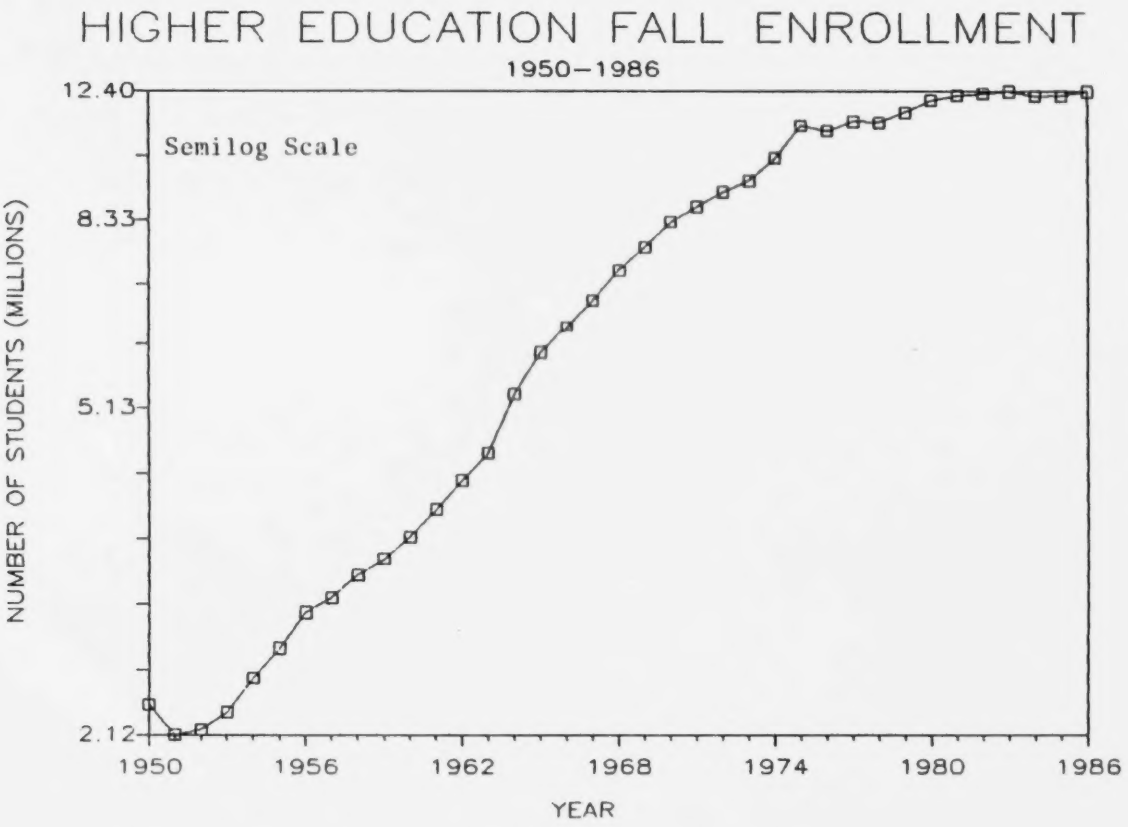
Long Waves and Enrollments

The effect of a particular long wave phase on enrollment is not clear. On the one hand, enrollment during economic downswings might be expected to increase due to higher rates of unemployment and thus less income foregone by attending college. This may apply especially to adult, part-time enrollment when the downswing is perceived as short-term. On the other hand, when an economic downswing is perceived as longer-term, the decline in family incomes as well as the disillusionment and pessimism accompanying the downswing may contribute to enrollment declines.

An examination of Figure 2 suggests that recessions during the prosperity phase of the current Kondratieff wave did not adversely affect enrollment until near the end of the deep 1973-75 recession and following the milder 1980-81 recession. Thus the rapid expansion of higher education enrollment which began in 1951, shortly after the trough of the Kondratieff wave, appears to have peaked about 30 years later, shortly after the peak of the Kondratieff wave. This has occurred for both two-year and four-institutions as well as for various disciplines within higher education (American Council, 1987; U.S. Department of Education, 1986).

If the periodicities of the economic long wave occur approximately as proposed by the model and as reflected in Table 1, higher education enrollment may suffer steep declines as the forthcoming downswing deepens. Those social and economic factors related to long wave downswings will be amplified by the long

Figure 2. Higher education entering fall enrollment.



Sources: American Council on Education; Center for Educational Statistics

anticipated demographic shifts also currently taking place and which appear to have been mitigated by such economic factors as labor markets.

Institutions of higher education that were overbuilt during the enrollment expansion of the fifties and sixties display an excess in productive capacity similar to that of capital-producing firms. The optimism, generalized prosperity, and growing enrollments, combined with capital-expansion lag time, during those two decades prompted academic leaders to dream of larger and larger physical plants. As with the physical capital-producing sector of the economy, the human capital-producing sector of the economy faces excess capacity and aging facilities. Both sectors also face the likelihood that some firms/institutions will not survive the decline in demand for their products that accompanies long economic downswings.

Institutions most likely to weather an extended economic downswing and generalized declining enrollment are those with (a) strong academic reputations and thus "built-in" attractiveness to prospective students, (b) well-established enrollment management systems that provide strategic advantages in institutional marketing, (c) access to larger population centers and nontraditional student markets, (d) clearly defined identities or missions, (e) innovative, cost-effective instructional delivery systems, or (f) creative student support systems. Most vulnerable to unstable enrollment (i.e., demand) during economic downswings likely will be those undifferentiated institutions whose physical plants were rapidly expanded during the past three decades but

where measures have not been taken to maintain enrollments.

Long Waves and Fiscal Affairs

Revenue. Consider the various revenue sources first. An economic downswing negatively affects family income and thus the ability of students to meet rising tuitions. Even substantial increases in tuition may realize little net financial gain to institutions due to the necessity of expanding financial aid programs. Reduced availability of commercial student loans to pay tuition also can be expected during a downswing. The result is that tuition revenue is quite susceptible to sharp declines during long-term economic downswings.

Institutions heavily dependent upon state appropriations will find increased competition for scarce state revenues as a downswing deepens. The impaired ability of citizens to pay taxes reduces state revenues just as demands increase for public assistance, unemployment insurance, and other public transfers. States may simply require a greater portion of institutions' revenues to be self-generated.

Private giving is a function of the economic well-being of the givers, whether corporate or individuals. Economic downswings in the past have brought widespread financial ruin to businesses and individuals and would likely do so again. A reversal of the recent rapid expansion in private giving to higher educational institutions would be expected during another long downswing.

Federal support in the forms of direct student aid, entitlements to veterans and other recipients, and research outlays will also likely decline somewhat during a long downswing.

This would be expected as attempts are made to bring government spending under control at the same time that demands increase for public assistance to those citizens most disenfranchised during the downturn. A higher education community already subjected to criticism by various quasi-federal bodies may be particularly vulnerable.

Expenditures. Costs to institutions can also be considered. The most critical costs to institutions during a falling cycle likely will become salaries and physical plant maintenance. Since higher education is labor intensive, wages and salaries comprise the major cost component for most institutions. Severe cost-cutting measures therefore will necessarily involve faculty and staff. Cost-cutting pressures will also result from declining enrollments, especially in certain disciplines, and from the increased availability of technology in teaching. In addition, those faculty and staff who survive personnel reductions will likely face further erosion of wages and salaries relative to price indexes.

The expected result for higher educational institutions will be similar to that for businesses: costs have to be cut as "profits" disappear due to falling demand for products. Heavily capitalized institutions, especially those with weak product bases, carrying substantial debt burdens have the least flexibility in cutting costs and run the highest risk of failure.

A institutional strategy in advance of a lengthy economic downturn would include reducing or reorganizing debt obligations, building financial reserves, improving cash management techniques,

developing marketing strategies consistent with institutional missions, and strategically paring long-term cost commitments. This obviously means shifting toward greater financial liquidity and flexibility. Since radical disinvestment may have a self-fulfilling effect during a contraction, academic officials may choose to proceed with caution, always keeping several options open.

Long Waves and Educational Delivery Systems

During a long economic downswing, many institutions will address declining enrollments and high "production" costs by experimenting with, and then implementing, innovative ways to deliver their products. Strong external degree programs coupled with rapidly developing tele-learning technologies, for example, offer opportunities to effectively take educational offerings, at relatively low cost due to their lower labor intensiveness, beyond the physical walls of institutions (Dunn, 1979; Louisiana Business Journal, 1987).

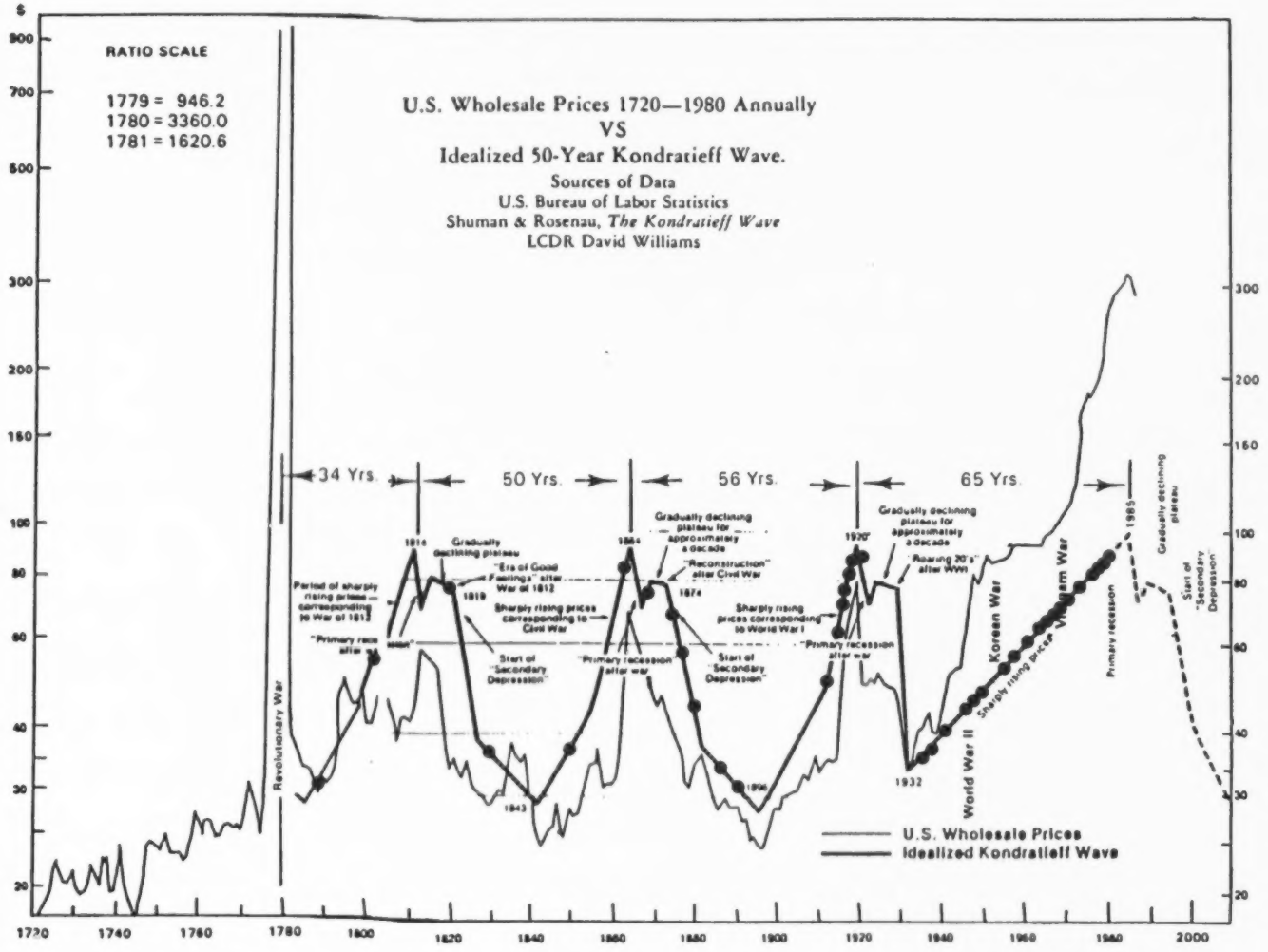
Applying technological and process innovation to production processes has been common during previous Kondratieff downswings, and can be expected again. Those institutional leaders who see the possibilities of using technological innovations such as tele-learning to enhance their productive efficiency will seize the initiative and utilize these technological innovations to create and maintain a comparative advantage for their institutions. In the process, these leaders also will address the critical problem of high production costs faced by traditional, residential institutions.

Long Waves and Governmental Involvement

The extent and nature of governmental involvement in higher education may be related to the phase of the economic wave. Figure 3 plots a "chronology of significant dates in the relationship between higher education and the federal government" as compiled by the American Council on Education (Frances, 1980, p. 22-25). A concentration of significant dates appears during two of the past three long wave upswings. The exception was the downswing following the Civil War and Reconstruction when several important actions were taken at the federal level, including the establishment of a Department of Education (1867), and the Hatch Act (1887) and Morrill Act II (1890). The past two long wave upswings, however, have been accompanied by a considerable amount of federal activity with respect to higher education.

Consistent with characteristics of long wave phases, the nature of governmental activity should reflect the particular point in the long wave. During the rapid growth period of the fifties and sixties, higher education was pressured to expand its productive capacities. Federal and state money was forthcoming to support program and physical plant expansion. During an economic downswing, however, increased criticism and demands for accountability by government representatives would be expected, perhaps accompanied by reductions in both direct and indirect governmental support and increases in direct government control. With declining public revenues that accompany economic downswings, governments may more easily justify withholding funding to higher education as a way of requiring institutions to put their houses

Figure 3. Significant dates in the relationship between higher education and the federal government and an idealized Kondratieff wave.



•Significant Date

Sources: Cycles, 1982, 33(4), p. 126-127; American Council on Education

in order. Recent reports criticizing higher education's "effectiveness" have appeared from such diverse groups as the National Governors' Association, the National Commission on Excellence in Education, and the Association of American Colleges, and they may represent the kinds of critical intervention to be expected in the future.

Summary and Conclusions

According to long wave chronology, the beginning of a sharp and lengthy economic downswing is near. Explanations of the behavioral causes and descriptions of characteristics of the long wave phenomenon apply equally well to businesses and institutions of higher learning. For example, during upswings common business, government, and other institutional policies and practices lead to rapidly expanding productive capacities and eventually to over-capitalization, excess capacity, and productive overshoot. The result of such a capital investment boom is a disinvestment bust.

This peaking of the long wave represents a major transition between economic eras, with many once-workable policies becoming obsolete. During lengthy economic downswings, optimism and idealism eventually give way to conservatism and risk-aversion. Unemployment rises while revenues, assets, and the ability to service debt fall. During extensive disinvestment, goals are frustrated and economic pain intensifies. This economic discomfort, however, gives rise to innovative productive processes, lower costs of production, and the acquisition of new wealth, all of which provide the energy driving the next phases of the long wave: recovery and prosperity.

As with businesses, a number of undifferentiated, overbuilt, and poorly managed colleges and universities will be bankrupted by the forces behind a lengthy economic downswing. Whether or not they actually close depends upon such factors as governmental intervention and public policy. Applying the long wave model, however, clearly points to extreme financial stress ahead for many institutions.

Many other institutions not only will survive, but will succeed during a lengthy economic downturn. Those are the institutions whose officials are sensitive to social, economic, and political transitions between long wave phases. Again applying the long wave model, this may involve such administrative practices as implementing innovative and cost-effective educational delivery systems (e.g., tele-learning); reaffirming traditional, perhaps ideological, missions; nurturing highly focused constituencies; or simply providing the highest possible quality education.

Thus the economic long wave model offers one framework for economic forecasting and for interpreting unfolding social, political, and economic events. In practicing environmental scanning within strategic planning, higher education leaders may find that the long wave provides a mechanism for anticipating powerful economic and social forces and for suggesting strategies in concert with the particular long wave phases. Recognizing the long wave phenomenon does not make a strategic planner a pessimist nor a cynic, but instead suggests alternatives for maximizing higher education's possibilities.

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